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FOREST RESEARCH NOTES

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FOREST SERVICE
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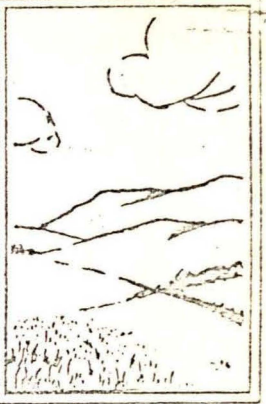
EXPERIMENT STATION

M.W.TALBOT, Acting Director



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RELATION OF FOREST LANDS TO AGRICULTURE, INDUSTRY, AND PEOPLE IN SOUTHERN CALIFORNIA

By M. W. Talbot, Acting Director
and
C. J. Kraebel, Chief, Division of Forest Influences

The Water Problem

In the south coastal basin of California, of which Los Angeles is the center, forests are chiefly important in the conservation of local water supplies--not for the production of lumber. In this territory the water furnished by the forest-covered mountains is essential for the irrigation of agricultural crops on more than a million acres of rich valley land and for the domestic and industrial needs of some four million people.

These mountain forests, lying within two hours travel time by automobile from the center of the metropolitan area, also fill important recreational needs. The regular recreational population of the San Bernardino National Forest alone during the summer months is more than 20,000 persons, and week-end and other short-term visitors total more than half a million visitor-days. This volume of recreational use is astonishing to strangers viewing the "brush-covered" mountains for the first time. The explanation lies in the cool deep canyons and in the pine forests at higher altitudes, which attract hikers, nature-lovers, fishermen and hunters alike. The average annual take of more than 7,500 deer from the four national forests in southern California in itself reflects the magnitude of the recreational resource.

The population of southern California is still growing rapidly. Yet this region, supporting about 50 percent of the State's total population, has only 2 percent of the State's total water supply. Ground water in most of the area has been periodically overdrawn by pumping for irrigation and domestic needs.

It is generally recognized that shortage of water is the limiting factor of growth in this area, whether of population, industry, or agriculture. Faced with increasing demands for water and a definitely limited local supply, heroic measures have had to be taken. The metropolitan area of Los Angeles has expended vast sums to bring water from the east slope of the Sierra Nevada by means of a 300-mile aqueduct, and from the Colorado River by aqueduct and tunnel aggregating another 300 miles. The total cost of these works has been approximately $550,000,000.

Paradoxically, despite its water shortage, the region also has a serious flood problem. To date about $250,000,000 have been spent by Los Angeles County and the Federal Government for flood-control works in the form of retarding basins, reservoirs, debris basins, and channel improvements to cope with heavy storm run-off. Plans are in hand for additional similar works in the south coastal basin that will bring the total flood-control expenditures to approximately half a billion dollars.

Taken together, the problems of water supply, flood, and erosion in this area are among the most serious in the United States.

Primary Functions of Forests in Southern California

The great bulk of the forest cover on southern California mountains is of a peculiar type known as "chaparral." This is a dwarf forest of shrubs and small trees covering some 5,000,000 acres of mountain watersheds. Within the chaparral, at elevations roughly above 5,000 feet, there are tracts of mixed conifer forest totaling some 500,000 acres, in which is concentrated the greater part of all recreational use in the mountains. The use of most of these coniferous areas for recreational purposes has reached such huge proportions that it transcends their value for lumber. Sporadic logging in a few of these areas, for strictly local consumption, produced only 532,000 board feet of lumber in 1942, a negligible amount in comparison with the pre-war annual importation and consumption of more than one billion board feet in southern California.

To persons uninformed regarding the chaparral it appears as so much worthless brush. But to those intimately familiar with it--the practical water manager, the old-time valley resident, the flood-control engineer--its place in the water economy of this region is recognized as indispensable. Its most vital function is to retard waterflow and erosion and to increase infiltration of water into the soil and underlying rock structures. In this area, therefore, the main objective of forest management is to maintain the forest cover for maximum performance of those functions. Some water, of course, is consumed by the forest for its own growth but, according to research results to date, this is a modest price to pay for the benefits derived in terms of reduced sedimentation and better regulated streamflow.

Underground water supplies in the valleys are replenished principally by run-off from the mountain watersheds. More than 90 percent

of the annual rainfall comes between November and March and a large part of this is usually concentrated in two or three heavy storms. Not infrequently, severe storms produce floods of torrential character. A single storm may bring as much as 15 inches of rain in 24 hours; and where the mountains have been denuded of their protective forest cover by fire, the floods often reach destructive proportions. Most of the flood damage is caused not by water alone but by the phenomenal loads of mud and rock carried by the streams. Such floods not only cause large property damage and occasional loss of human lives, but represent a further irretrievable loss in the escape of large volumes of water to the ocean.

Under these conditions local water supplies must be conserved to the utmost. Mutual water companies throughout the region have developed to a high degree the conservation of water from the mountain canyons. They prize this water and usually prefer it to "imported" water which might cost them less.

Elements of Work Programs for Southern California Forest Watersheds

In the light of the preceding outline of the water problems of southern California, forest management in this area resolves itself essentially into ways and means of obtaining from the local brush-covered watersheds the maximum yield of usable water without excessive erosion.

During the war, work in these highly inflammable brush forests has been concentrated almost exclusively on emergency fire protection and the bare maintenance of facilities and equipment to prevent their excessive depreciation. Consequently considerable backlogs of postponed work have been accumulated by public agencies dealing with forest land in southern California. These include, in addition to the Federal Forest Service, several County forestry and fire-control organizations, the State Division of Forestry, and the Conservation Association of Southern California. Outstanding among these local agencies is the Los Angeles County Department of Forester and Fire Warden. Plans for undertaking this postponed work in an orderly manner after the war are now being developed. They include strengthened research to insure the most efficient methods of managing the forest water crop.

These programs provide a substantial reservoir of necessary and constructive work for the improvement of watershed lands to reduce erosion and debris deposition in reservoirs, to increase penetration of rainfall into the soil, and gradually to increase the proportion of clear and usable water.

For the Los Angeles River watershed an upstream improvement program to the extent of $11,500,000 has been started by the Department of Agriculture under an initial allotment of $1,400,000. Authorization for the remainder is contained in the 1944 Flood Control bill under consideration by the Congress. Since national forests embrace most of the

mountain lands, the Federal share of this project is $8,500,000 and the share of State and local governments and private individuals is $3,000,000. Plans for similar programs are in various stages of completion for watersheds of the San Gabriel, Santa Ana, Santa Ynez, Santa Maria, and San Diego Rivers. These programs are integrated with downstream programs of the Army Engineers and of local flood-control and water-conservation agencies.

Major features of the watershed-improvement work are:

1. Increased protection of the forests from fire. Chaparral, the natural watershed cover for the southern California mountains, functions best as protective cover when it is more than 40 years old. To protect it is cheaper than to replace it. The aims of increased fire control are to reduce the amount of forest burned each year, and to keep all fires as small as possible. At present the average annual burn is about six-tenths of one percent of the total forest area under protection; the objective of better protection is two-tenths of one percent. At present large fires covering upwards of 5,000 acres are still too frequent. The objective is to put out all fires while they are too small to do serious damage, and to hold even the occasional big ones to about 2,000 acres. This does not mean that 2,000-acre fires are not serious. On the contrary, fires of that size have been responsible for destructive floods. That figure is set as a possible attainable goal under the full application of our present knowledge of fire behavior and present techniques of fire control, both of which may reasonably be expected to be advanced still further by continued research.

2. Cover improvement, including direct seeding in areas of depleted cover and in newly burned areas. By prompt sowing in fire-denuded areas a quick cover crop can be developed that protects the bare soil during several years while the native chaparral is growing back from sprouts and seeds. For this first-aid purpose common mustard has been found thus far to be the best plant, although the search for better species continues. The planting of pine or other forest trees in these southern mountains under present conditions is justified only on a very limited scale, chiefly in the vicinity of cabins, campgrounds and roadsides, and in burns in the conifer areas.

3. Upstream channel stabilization works, in the form of strategically placed check dams, jetties, and revetments. In many canyons such structures are needed to retard both the too-rapid lowering of the channel bottom and the undercutting of unstable slopes, before enough vegetation can be established to get reasonable control over the soil.

The volume of such work of forest protection and improvement is indicated by preliminary estimates of the Forest Service for the four national forests in southern California, namely, the Angeles, Los Padres, San Bernardino, and Cleveland. As estimated by the Regional Forester, the 3-year post-war program on these Federal areas will employ approximately 8,000 man-years of labor at a total cost of $29,000,000. Similar

estimates are in preparation by other public agencies for non-Federal lands within the area.

It must be emphasized that artificial works, necessary as they are, will not take the place of the native chaparral forest cover in southern California. This region must have both. The close proximity of rugged mountains to densely populated centers compels use of the most effective measures to safeguard the lives and welfare of the people. By and large it is too late to talk of "zoning" in the sense of moving communities out of all flood paths. Many thousands of people live and work in flood zones from which they will not now be moved. They demand the positive protection of great engineering structures. They demand also the restraining influence of the best possible forest mantle on the steep slopes of these highly erosible mountains.

The execution of these programs, upstream and downstream, carefully articulated, will provide employment for large numbers of people for several years immediately after the war and for moderate numbers of people on a permanent basis. The mountain program, by its very nature, will have to be accomplished progressively and will afford a reservoir of jobs on a moderate scale for many years in the future. The deterioration of forest cover through human interference during the period of rapid population growth in the last 50 years has been great. It will take many years of high protection and corrective treatment to bring these valuable forests to their proper usefulness in the whole economy of southern California.